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(54) **SYSTEM AND METHOD FOR SELECTIVE AND MAINTAINED ACTIVATION OF SENSORY PERIPHERAL NERVE FIBERS**

(71) Applicant: **Greatbatch Ltd.**, Clarence, NY (US)

(72) Inventors: **Kerry Bradley**, Glendale, CA (US); **Leslie Halberg**, Valencia, CA (US)

(73) Assignee: **Greatbatch Ltd.**, Clarence, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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Primary Examiner — Rex R Holmes
(74) *Attorney, Agent, or Firm* — Haynes and Boone, LLP; Eric Li

(57) **ABSTRACT**

Electrical stimulation is applied to a patient at least in part via a pulse generator. A motor fiber component of an action potential that is evoked in response to the electrical stimulation is measured. A sensory fiber component of the action potential is also measured. A relationship between the motor fiber component and the sensory fiber component is determined. For example, a ratio between the sensory fiber component and the motor fiber component may be calculated, or the absolute sizes of the sensory fiber component and the motor fiber component may be compared. Based on the determined relationship between the motor and sensory fiber components, a paresthesia of the patient is estimated.

20 Claims, 56 Drawing Sheets